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# DOUBLE FLUKE SECURITY SEALING RING FOR WATT-HOUR METERS

## FIELD OF THE INVENTION

5 The present invention consists of a security  
sealing ring for watt-hour meters, and relates to the  
electric utility industry using watt-hour meter equipment  
to measure electric power consumption at residential,  
commercial and industrial premises so that the electric  
power supplier company entrusted to offer this service may,  
10 subsequently, issue a service charge receipt per amount of  
consumed electric power, and particularly wherein the watt-  
hour meters use security sealing rings, belts or straps. .

## BACKGROUND OF THE INVENTION

15 This invention particularly relates to security  
sealing rings or straps universally used in single-phase  
and polyphase watt-hour meters with the object of avoiding  
removal of the components making up the same, as well as  
avoiding alterations in the watt-hour meters by the user,  
20 with the purpose of evading or preventing the utility  
company serviceman from taking real lectures of electric  
power consumption to be reported to the electric power  
supplier company.

25 The electric utility industry employs socket-type  
watt-hour meters to measure electric power consumption,

commonly mounted on a wall of residential, commercial and industrial buildings; said watt-hour meters contain terminals which are connected to the electric line or to electric load conductors. The terminals are also connected to internal conductors within the socket, which extend to jaw contacts positioned to receive the blade terminals of a plug-on watt-hour meter to complete an electric circuit through the watt-hour meter between the line and load terminals and the conductors.

The socket-type watt-hour meter has a ring-type cover, which includes some annular mounting flanges projecting outwardly from an opening through which the blade terminals of the watt-hour meter extend. Both mounting flanges are maintained joint together by means of the meter ring and the base housing, once assembled they are encircled by the security sealing ring, sealing thereby the single-phase or polyphase watt-hour meter to the base.

A common type of belt seal for socket-type watt-hour meter usually includes a lock that slips into a fluke, which extends outwardly at one end of the belt, and slipping the fluke through a slot formed in the other end of the belt or sealing ring.

Another common type of lock belt seal consists on a bolt passing through flukes, which are bent downwards, and are located at each end of the security belt.

Another type of belt seal consists on a fluke formed by a first end of an angular strap including a plurality of linearly spaced openings, and a cover secured to the other end of the strap, and including a passage through which the fluke extends retractable. The belt has a fastener or screw mounted in the cover in order to mate with the spaced apertures in the fluke; the fluke moves forward and backward at the first end of the strap or another fluke moves forward and backward at the second end of the strap. Both flukes are separated from the second end of the strap and within the openings of the straps. The sealing action is obtained by means of some sealing wires or plastic padlocks inserted through the openings of each fluke in order to indicate when the sealing mechanism in the belt seal has been tampered.

The wires used to join the flukes are tied together by means of a lead piece, not with the intention of securing the system, but to indicate that said system has not been opened, and likewise the padlock has not been manipulated in any way. This system has the inconvenience of requiring a key in order to be opened, which the authorized serviceman of the electric power supplier company may not be carrying along, may have lost, or the padlock may be damaged by the failed attempts of some user when trying to open it. Thus when finding such

inconveniences, the maintenance task is not performed with an adequate periodicity, and this lack of maintenance may cause failures in the watt-hour meter lecture system, or the electric power supplier company may have to incur in additional expenses when having to change the padlocks constantly.

Another type of sealing ring, belt or strap seal consists on an open ring bearing at one end, and a fluke with a series of horizontal notches on both sides thereof. Said fluke is inserted on the other end of the ring inside a ladle, which has side shoulders in order to facilitate the notches obstruction to prevent the fluke from retraction.

Another type of sealing ring, belt or strap seal consists on two substantially identical "U" shaped covers each one placed on each end of the annular strap. In said strap there are some openings or slots located at the lateral walls of each cover. There is an additional slot on each cover, receiving an insert having an opening centrally formed. One headed screw is mounted on the insert of one of the covers, and the opposite end of it passes through the other cover insert, at the opposite end of the fastener and is hooked to the insert opening of the other cover. The end of the fastener opposite to the head of the screw has an elongated slot, which is aligned by

rotation to the openings in the sidewalls in order to receive a sealing wire or a plastic padlock after the ring has been mounted to attach the watt-hour meter and the meter socket cover. Said mechanism has the inconveniences that it may be damaged by failed attempts of some user when trying to open it or said damage in the mechanism may prevent an authorized serviceman from opening the mechanism in order to carry out the periodical maintenance, thereby the impossibility to carry out the maintenance may cause failures in the lecture system of the watt-hour meter, or incurring on additional expenses when having to change the security mechanisms constantly.

Several examples of the state of the art related to security sealing ring, belts or straps have been published on different U.S. patents, such as Nos. 4,008,585; 4,076,291; 4,134,609; 4,149,741; 4,493,230; 4,531,770; 4,934,747; 5,048,881; 5,207,595; 5,704,804; 5,851,038 and 5,944,555. All these security sealing rings, belts and straps present one or more disadvantages, where the following stands out: poor flexibility not being able to be used more than once, complex mechanism, complex installation, high production costs, need of specialized means (keys, padlocks, sophisticated tools, etc.) in order to remove the security sealing rings, belts and straps. It is necessary to point out that said U.S. patents do not

affect the novelty nor the inventive step, as for the security lock mechanisms from the present invention are totally different from the ones in the U.S. patents above-mentioned.

5           It is important to mention that on May 18,1999, the same inventor of this case, filed Mexican patent application 994595 corresponding to "Single use security sealing ring for watt-hour meters". The single use sealing ring presents an irreversible hooking system; that is to say, once the sealing wire is destroyed, said system cannot be used again, which makes it disposable. In contrast, the sealing ring of the present invention can be opened once the sealing wire is cut by the maintenance serviceman from the electric power supplier company and can continue or extend its use by placing a new sealing wire. Furthermore, the single use sealing ring presents a much higher production cost since the materials making up the same are structurally robust, while the double fluke sealing ring requires materials with less thickness for its production. In conclusion, the double fluke sealing ring presents superior characteristics than those offered by the single use sealing ring, being more versatile in its functionality and structurally, more simple.

25           An object of the present invention refers to solve problems such as the use of mechanisms currently

offered in the security sealing rings or straps market which are constructed with very complex mechanisms, so when being tampered their replacement originates high costs to the electric power supplier company, either due to the replacement of the security sealing ring mechanism or due to the replacement of the watt-hour meter, which may break upon a tampering action watt-hour.

One object of the present invention is to provide a security sealing ring which offers advantages, such as easy installation due to the simplicity of the mechanism, easy detection of a violated or altered security sealing ring, tamper resistance, multiple use with the purpose of facilitating and diminishing the maintenance service costs, and a reduced price compared to the security sealing rings currently offered in the market.

#### SUMMARY OF THE INVENTION

The present invention comprises a security sealing ring for watt-hour meters, consisting of a sealing ring made of resistant material, preferably stainless steel type 430, with security rims rolled along the sealing ring body on both sides. Said security sealing ring meets the ANSI (American National Standard Industry) construction standards for residential, commercial and industrial watt-hour meters, which establishes the minimum and maximum



dimensions of the permitted circumference.

The security sealing ring for watt-hour meters of the present invention comprises a circumference-shaped security sealing ring with a locking mechanism at each of its ends.

One preferred embodiment of the invention is a locking mechanism comprising at one end, two flanges projecting at 90° and forming a double fluke. Each flange has a central slot horizontally formed, both slots being positioned face to face. The other end of the security sealing ring has two parallel and equidistant slots; so that the two flanges of the fluke can respectively get through said slots upon assembling the watt-hour meter and the socket-type base. In this way, both the watt-hour meter and the base remain firmly attached and, later on, a lead or plastic sealing wire is introduced through the slots in the two flanges of the fluke, thereby identifying the security sealing ring once it is closed as a tamper resistant security sealing ring.

Once the security sealing ring for watt-hour meters is placed and closed through the hooking action and effect produced by the interaction between the two flanges of the double fluke, located at one end of the security sealing ring, and the slots on the other end of the device of present invention, and once the sealing wire has been

placed, it is not possible to revert the hooking action and effect of said double security fluke. Since the wire diameter is practically of the same size of the flange slots, it is not possible to maneuver the sealing wire, thereby avoiding the removal of the ring and of the glass cover to alter the watt-hour meter record.

Once the security sealing ring is placed in the watt-hour meters, it provides a greater security in watt-hour residential, commerce and industrial areas, where a big number of illegal manipulations are performed; as said mechanism has the sealing wire, which performs the hooking action and effect through the security flanges of the double fluke, a "tamper resistant" lock is obtained, under normal conditions of use. The only way to open or release said tamper-resistant locking mechanism is by cutting the sealing wire. The present invention offers the advantage that the serviceman from the electric power supplier company may cut the sealing wire, unhook or open the double fluke sealing ring and fulfill the necessary maintenance service over the watt-hour meter, attach the same security sealing ring and place another sealing wire. Furthermore, the advantages of the double fluke security sealing ring above mentioned, as those skilled in the art can appreciate, are the following: during maintenance services the serviceman from the electric power supplier companies

not bound to carry keys, padlocks, sophisticated tools,  
etc.; easy detection of a violated double fluke security  
sealing ring and prompt solution; easy to install due to  
the simplicity of the mechanism; great functionality; low  
5 production cost, among others.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 shows a perspective view of the  
polyphase watt-hour meter, which uses the security sealing  
ring of the present invention.

FIGURE 2 shows a perspective view of the single-  
phase watt-hour meter, which uses the security sealing ring  
of the present invention.

FIGURE 3 is a top front view of the polyphase  
watt-hour meter, which uses the security sealing ring of  
the present invention.

FIGURE 4 is a top front view of the single-phase  
watt-hour meter which uses the security sealing ring of the  
present invention.

FIGURE 5 is a top side view of the polyphase  
watt-hour meter which uses the security sealing ring of the  
present invention.

FIGURE 6 is a top side view of the single-phase  
watt-hour meter which uses the security sealing ring of the  
present invention.

FIGURE 7 is an isometric projection of a conventional single-phase watt-hour meter to measure electric power, which uses the security sealing ring of the present invention.

5           FIGURE 8 is a side view of the parts making up the security sealing ring for watt-hour meters.

FIGURE 9 is a detailed view of the security sealing ring locking mechanism in its opened form.

10           FIGURE 10 is a detailed view of the security sealing ring locking mechanism of the present invention.

FIGURE 11 is a sectioned view of Figure 10 showing the details of the hooking action of the two ends of the security sealing ring of the present invention.

15                   DETAILED DESCRIPTION OF THE INVENTION

With regard to the present invention, its use has been illustrated in the drawings of figures 1 to 7 and in the drawings of figures 8 to 11, as the parts making up the same. A security sealing ring to be used in the watt-hour  
20 meters (Figures 1, 3 and 5) has been mentioned to indistinctly be applied in polyphase and single phase watt-hour meters (Figures 2, 4, 6 and 7), wherein a complete socket type housing of a conventional polyphase and single phase watt-hour meter is shown containing, as one part, a  
25 polyphase meter (4) in the case of Figures 1, 3 and 5; and

5 a single phase watt-hour meter (5) in the case of Figures  
2, 4, 6 and 7, integrated to the socket type housing base  
(2) for Figures 1, 3 and 5; and (8) for Figures 2, 4, 6 and  
7. Both watt-hour meters show one double fluke security  
10 sealing ring from a perspective view of the polyphase meter  
in Figure 1 (3), from a top frontal view in Figure 3 (3),  
and from a top side view in Figure 5(3); and  
correspondingly for the single phase meter in Figures 2, 4,  
6 and 7 (6), in the same position. In Figure 7 an  
isometric projection of the security sealing ring (6) to be  
used in a conventional single-phase (5) watt-hour meter, is  
shown.

15 Placement of said security sealing ring (3) and  
(6) is made in the base of the polyphase meter (4) and of  
the single phase meter (5), wherein said polyphase (4) and  
single phase (5) meters mate with the socket type housing  
base (2) for Figures 1, 3 and 5; and base (8) for figures  
2, 4, 6 and 7; in both cases, the meters provided with  
rims which form an annular surface all around, and once the  
20 base of the polyphase meter (4), and the base of the single  
phase meter (5), respectively, have mated to the socket  
type base, the formed rims are capable to receive the  
double fluke security sealing ring (3) for Figures 1,3 and  
5; and (6) for Figures 5,4,6 and 7. The electric power  
25 supplier company servicing input is shown as (1) for

Figures 1,3 and 5; and as (7) for Figures 2 and 4.

In the isometric projection of Figure 7 a ring (9) having the single-phase meter (5) cover assembled, can be observed.

5 Figure 8 is a side view of the parts of the security sealing ring, such as the two flanges projecting at 90°, which form an end of the security sealing ring body, and which originate the double sealing ring (10). In this same figure the other end of the security sealing ring can be appreciated, which comprises two parallel and equidistant slots (11) through which the two flanges in the double fluke (10) are introduced upon assembling the watt-hour meter and the socket type base. Each of the flanges of the double fluke (10) presents a central horizontal slot so that when the security sealing ring may be closed and activated; a foreign wire which has inserted therein a lead or plastic seal may serve to indicate that the security sealing ring was placed by the electric power supplier company serviceman.

20 Figure 9 shows the security sealing ring opened, and the two ends can be appreciated. Reference number (11) corresponds to the sealing ring end bearing the two slots where the two flanges of the double fluke (10) at the opposite end of the device of present invention will be  
25 inserted. Each flange of the double fluke (10) is bent

90°, and has a central horizontal slot, through which the sealing wire is inserted, thereby allowing to determine whether the double fluke security sealing ring has been violated or remains intact.

5           When placing and closing the double fluke security sealing ring in Figure 10 the complete detail of the locking mechanism can be observed; wherein the end of the double fluke (10) bears the two flanges bent at 90°, so as to interact with the two parallel and equidistant slots  
10       (11) that are located at the other end of the security sealing ring. When activating said lock, a hooking action and effect is generated. Said locking mechanism of each element on each end forms a 15° angle at each slotted flange.

15           Once the hooking action and effect are generated between the double fluke (10) and the opposite end bearing the two slots (11), and once the sealing wire has been placed, it is possible to reverse such action by simply  
20       eliminating the sealing wire, thereby the present invention can be unhooked or opened in order to perform the necessary maintenance service over the watt-hour meter. Once this service is concluded, the procedure is repeated in order to place the same double fluke security sealing ring to secure  
25       the system with a new sealing wire, which identifies that the security sealing ring has not been violated or altered.

The above mentioned procedure offers the great advantage of reducing costs to the electric power supplier company, since only the sealing wire is replaced, but not the security sealing ring itself.

5           Figure 11 is a sectioned view of Figure 10 and shows assemblage of the two ends of the security sealing ring, i.e. the double fluke (10) and the opposite end containing two slots (11).

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